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Ottawa Canada
K1A 0C9

(21) (A1) 2,021,458
(22) 1990/07/18
(43) 1992/01/19
(52) 325-41

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(51) INTL.CL. H04B-7/26

(19)(CA) **APPLICATION FOR CANADIAN PATENT** (12)

(54) Passenger Entertainment System for Coaches

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(57) 20 Claims

Canada

ABSTRACT OF THE DISCLOSURE

An entertainment system for delivery of video and audio information to individual passengers on coaches such as buses. The system comprises one or more video cassette players, one or more monitors electrically associated with the video cassette players and circuitry to electrically connect the video cassette players and monitors to an electrical power source. A radio transmitter means, powered by the electrical power source, is electrically associated with the video cassette players to effect wireless transmission of audio signals from the video cassette player to a plurality of receiver means positioned in the vicinity of the passengers.

BACKGROUND OF THE INVENTION

The present invention relates to an entertainment system for delivery of video and audio information to individual passengers on coaches such as buses. The system may be readily adapted to and used on trains, boats, motor homes, school buses and other forms of public transit.

Conventionally, the bus industry has installed video systems on coaches comprising a single video cassette player (VCP) with a pair of monitor spaced in the coach so that the passengers can see them. The audio from the VCP is passed by wires to existing overhead speakers. An inverter converts D.C. from the bus' battery (usually 24 volts) to A.C. (110 volts) to power the system. Problems with such systems have included the fact that they are fixed in place and hard to install and remove from the bus for servicing or the like, the driver has very little control over the system when the bus is in motion since he must go to the VCP to turn it on, etcetera. As well persons who do not want to follow the monitor can still hear the audio. Also, these systems are very prone to internal "noise" from the bus' electronic system and, because of the manner in which the player and monitors are mounted, vibrations of the coach tend to affect the quality of the image delivered to the monitors.

Of general background interest describing video systems for passengers in public transit vehicles is U.S. Patent No. 4,756,528 of Umashankar issued July 12, 1988 which describes and illustrates a TV screen arranged in the seat back of a bus or the

like and disposed immediately ahead of a second seat with a video cassette player conventionally connected to the screen.

It is an object of the present invention to provide an entertainment system for delivery of video and audio information to individual passengers on coaches such as buses which will overcome many of the problems found with such prior art systems.

SUMMARY OF THE INVENTION

In accordance with the present invention there is provided a passenger entertainment system for coaches having seats for passengers. The system comprises one or more video cassette player means, one or more video monitor means electrically associated with the video cassette player means, and circuitry to electrically connect the video cassette player means and monitor means to an electrical power means, to drive the video cassette player means. A radio transmitter means, to be powered by the electrical power means, is electrically associated with the video cassette player means to effect wireless transmission of audio signals from the video cassette player means to a plurality of receiver means positioned in the vicinity of the passengers. The receiver means are each selectively operable in conjunction with a head set releasably securable thereto to provide audio signals directly to the ears of a passenger.

In a preferred embodiment of the present invention there is also provided a remote control switch means electrically associated with the video cassette player means to control the

on/off and video cassette playing switching of the video cassette player, and the providing of power to the system. In addition, a receiver is located in the vicinity of each passenger, each such receiver being powered by battery means releasably insertable into that receiver. The head sets comprise earphones having a wire lead to be releasably connected to one of said receiver means.

The modular nature of the present invention permits easy installation of the components on a coach, where they may be readily locked in place or removed as required. The system according to the present invention provides improved quality of image to the monitors with little or no effect from vibration or internal noise generated by the bus' electronic system. The system provides individual audio delivery to each passenger in the coach, as desired, with the audio being delivered in one embodiment, by wireless means without the use of overhead speakers of the bus. As well the system is very portable. It is designed to be remotely operated by a bus driver while driving the bus.

BRIEF DESCRIPTION OF THE DRAWINGS

These and other objects and advantages of the invention will become apparent upon reading the following detailed description and upon referring to the drawings in which:

FIGURE 1 is a schematic view of an entertainment system for coaches in accordance with the present invention, as installed in a bus, the system including video cassette players, a radio transmitter and wireless receivers;

FIGURE 2 is a perspective view of a pair of video cassette players and their casing in accordance with the present invention;

FIGURE 3 is an exploded view of a monitor and part of the monitor support system of the system of FIGURE 1;

FIGURE 4 is a schematic exploded side view of the monitor support system of FIGURE 3;

FIGURE 5 is a perspective view of a receiver of FIGURE 1; and FIGURE 5a is a side view of a battery/earphone combination to be used in conjunction therewith;

FIGURE 6 is a perspective view of a remote control panel for the system of FIGURE 1 to be positioned in the vicinity of and operated by a bus driver;

FIGURE 7 is a schematic functional layout diagram of the contacts and circuitry of a logic control means which controls the functioning of various components of the sytem of the invention;

FIGURE 8 is a circuitry diagram of a common-mode choke filter used to minimize electrical interference and noise in the circuitry for the system of FIGURE 1;

FIGURE 9 is a schematic view of a bus carrying the system of the present invention modified to receive external signals for passing through the system of the present invention installed on the bus; and

FIGURE 10 is a flow sheet of a cellular video distribution concept for use in conjunction with a system according to FIGURE 9.

While the invention will be described in conjunction with

example embodiments, it will be understood that it is not intended to limit the invention to such embodiments. On the contrary, it is intended to cover all alternatives, modifications and equivalents as may be included within the spirit and scope of the invention as defined by the appended claims.

DETAILED DESCRIPTION OF THE INVENTION

In the drawings, similar features have been given similar reference numerals.

Turning to FIGURE 1 there is illustrated, in schematic fashion, a passenger entertainment system 2 for a bus 4 having seats 6 for passengers. System 2 comprises, in the illustrated embodiment, a pair of video cassette players 8 (VCPs) and monitors 10 spaced in the bus from front to rear and secured in overhead fashion, as will be described in more detail hereinafter, to the luggage rack 12 in a manner such that all passengers will have a clear view of at least one of the monitors. Electrical power means, preferably the bus' battery 14 provides electrical power through appropriate circuitry, which will be described in more detail hereinafter, to drive the electrical components of the system, including the VCPs and the monitors. An FM transmitter 16 is electrically associated with the VCPs 8, again powered by battery 14, to effect wireless transmission of audio signals received from the VCPs to receivers 18 which are positioned in the vicinity of the passengers. Each of the receivers 18 is operable in conjunction with a head set 20 which is releasably securable

thereto to provide audio signals directly to the ears of an individual passenger. Receivers 18 in the illustrated embodiment are attached, by releasable attachment means 22 (FIGURE 5), to the backs of seats 6.

Turning to FIGURE 2 there are illustrated, in more detail, the VCPs 8 mounted in place in accordance with the present invention. These VCPs are supported within case 24, one over the other, with a lock means to releasably secure the VCPs in case 24 and prevent theft and the like. Case 24 provides individual racks 28 for each of the VCPs 8. Racks 28 are securely mounted to the bus, for example, to the luggage rack 12 near the front of the bus, whereby the bus driver will have ready access to the VCPs for inserting and removing cassettes. A blind-mating connector 30 at the back of each of the racks 28 aligns itself with the electrical contacts for the corresponding VCP 8 when that VCP 8 is in position in its rack 28 and makes contact therewith. Appropriate cabling 32 is releasably connected, at one end, to sliding connector 30 and, as will be described in more detail hereinafter, extends to a logic control means 34 (FIGURE 1).

The construction and mounting of monitors 10 is illustrated in more detail in FIGURES 3 and 4. Safety, since the monitors are mounted overhead and might otherwise be prone to being hit by a passenger's head is a factor taken into account. As well, it is important to ensure that as little vibration as possible is transmitted to the monitor by movement of the bus. As well, theft and vandalism of the monitors is an important consideration in their construction and mounting, since the monitors are essentially

mounted in a public environment.

To minimize head injuries as a result of passengers coming in contact with monitor 10 and to minimize vandalism as well, monitors 10, which are conventional T.V. monitors, modified to have internal D.C. - D.C. H.V. converters 35 so that they will operate on D.C. current from the bus' battery 14, are encased in a wraparound, moulded plastic housing 36 as illustrated. The housing is moulded of three pieces, 38, 40 and 42, with front piece 42 having its lower section 44 of a soft, resilient, more rubbery consistency. No controls are normally exposed, to avoid vandalism and the like. Monitor 10 is wired so that its electrical contacts 46 are at top, at the side of a pocket or depression 48 having side support and guide tracks 50 extending along opposite sides for guiding and receiving the sides of a support shoe 52. At end 54 of shoe 52 are mating electrical contacts 56 for monitor contacts 46, so that one set of contacts may be plugged into the other when shoe 52 is properly seated in pocket 48. As well, a key operated lock means 58 is associated with monitor housing 36 and cooperates with shoe 52 in a conventional manner so that monitor 10 may be locked in position on shoe 52 to prevent its unwanted removal. Lock means 58 may be of any conventional construction.

Shoe 52 is formed from a moulded polymer, with electrical contacts 56 and square brackets 60 (which slide in guide tracks 50) moulded in it. Also embedded in shoe 52 is one end of pipe 62. Cable wires 63 extend from contacts 56 of shoe 52, through that shoe and up pipe 62 to logic control means 34, for providing power and video signals to monitor 10.

As can be seen in FIGURE 4, the upper end of pipe 62 is provided with threads 64. An appropriate hole 65 to flushly receive and let pass that end of pipe 62 is provided in luggage rack 12 as illustrated, on which luggage rack 12 sits shock mount 66 which again is provided with an aperture 68 aligned with aperture 65 through luggage rack 12 for passage of the upper end of pipe 62. Shock mount 66 is secured, for example by means of self-tapping screws 67, to luggage rack 12. Shock mount 66 is made of an appropriate resilient material such as rubber or the like. A flange 70 and keyed washer 71 are bolted by means of bolts 72 to shock mount 66 and luggage rack 12, to hold shock mount 66 in position. Flange 70 has a central aperture threadably to receive the upper end of pipe 62. A lock nut 74 is threaded to the upper end of pipe 62, with keyed washer 71 positioned between lock nut 74 and flange 70 as illustrated. These components form an excellent shock mount assembly for monitor 10 which ensures that monitor 10 is securely held in position, suspended downwardly from luggage rack 12, in such a manner that minimal vibrations are passed to the monitor.

Transmitter 16 (FIGURE 1) is a standard FM radio wave transmitter, preferably transmitting on any one of five channels in the 49 megaHertz band (i.e. 49.83 mHz, 49.845, 49.86, 49.875, 49.89) (conforming to Part 15 of the F.C.C. Rules). It is preferred that transmitter 16 have a short range (e.g. 100 yards). Through logic control means 34, the audio signal from VCP 8 is received and, if transmitter 16 is activated, transmitted to receivers 18.

Turning to FIGURE 5, receivers 18 are provided for each passenger. The receiver is an FM tuner 70, less a speaker, inserted in a specially designed housing 80 releasably mounted to the back of a seat 6. The shaping of housing 80 is such that it provides no outwardly projecting sharp corners which might expose a passenger to injury. Each receiver has a volume control 82 and channel control 84, the receiver to receive FM transmissions from a preselected channel of transmitter 16. Battery receiving pocket 86 is formed in the front surface of case 80, for insertion of a battery 88 (FIGURE 5A) (preferably a 9 volt battery). Resilient clips 90 force the battery, when inserted in pocket 86, upwardly so that its terminals 92 come in contact with corresponding receiver battery contacts 94.

Instead of inserting a jack mounted on the lead wire of head set 20 into an aperture, as would be the case with a conventional receiver, to connect head set 20 to the audio contact (such aperture being prone to vandalism), the audio contact for the receiver of the present invention is provided by means of an external contact point 96 in pocket 86. The lead wire 98 for head set 20 has its free end terminate on the casing 100 of battery 88 in such a location that, when battery 88 is properly inserted in pocket 86, lead wire 98 will be in electrical contact with audio contact point 96. In this way, the walls of pocket 86 as well as clips 90 act as guides not only to properly position battery 88 within pocket 86, but also in conjunction with battery 86, to ensure that the end of lead wire 98 contacts audio contact point 96 when the battery is in position.

As an option, a bridge rectifier may be associated with contacts 94 so that regardless of which terminal of battery 88 touches either of terminals 92, the battery will operatively power receiver 18.

As can be seen in FIGURE 5, lead wire 98 extends to ear phones 102 of headset 20 to provide a very simply yet effective means of providing audio signals directly to a passenger's ears.

Transmitter 16 may be arranged to be portable, or an auxiliary transmitter 16 may be provided, together with removable, portable receivers 18 so that, for example, a tour guide with the bus may take transmitter 16 and provide audio information to passengers, for example when touring a site outside of the bus.

As can be seen in FIGURE 1, through logic control means 34, the existing audio paging system 104 of the bus, whereby speakers direct audio signals through the bus to the passengers may be used as an alternative to or in conjunction with transmitter 16 and receivers 18.

Turning to FIGURE 6 there is illustrated a remote control hand-operated unit 106 to be positioned near the operator of the bus. Electrically connected with logic control means 34, remote control unit 106 provides a power switch 108 for activating power to the system from battery 14, power indicator lamp 110 to indicate whether or not the system is on or off, video switches 112 to permit activation of a predetermined one of VCPs 8, audio switches 114 to provide audio from the activated VCP 8 to the passengers either through the speakers of the bus' audio paging system 104 or through receivers 18 and a series of control switches 116 for each

of VCPs 8 (rewind, stop and forward play functions). The face 117 of remote control unit 106 is preferably provided with back lighting means so that the bus driver can readily see each of the switches and ascertain its intended function in darkened conditions. An appropriate mounting bracket 118 is provided so that control unit 106 can be readily mounted in the vicinity of the bus driver for ease of operation.

Remote control unit 106 is electronically associated by cabling 119 with control logic means 34. A typical functional layout of logic control means 34 is illustrated in FIGURE 7. Logic control means 34 operates like a small computer, taking signals from remote control unit 106 and translating and buffering them to effect the proper control functions for the VCPs 8, FM transmitter 16 (or audio paging system 104) and monitors 10.

It should be noted that cabling 120, shown schematically in FIGURE 1, extending from logic controller means 34 to VCPs 8, monitors 10, remote control unit 106, transmitter 16 and battery 14 is sectional, each section being provided at both ends with plug connectors to facilitate the installation and removal of the system and its individual components.

To improve the image from the VCP 8 to monitors 10 and minimize or eliminate electrical noise which might otherwise distort or interfere with that image, a noise filter 122 is installed in the circuitry between battery 24 and logic control means 34 as illustrated (FIGURE 1). This filter 122 also provides electrical isolation from the power source. Filter 122 preferably takes the form of a common-mode choke, a schematic example

embodiment of the circuitry thereof being illustrated in FIGURE 8. Under normal operating conditions, power supplied through this common-mode choke is balanced. Transient noise pulses cause an imbalance in the power line current with resultant interference to or distortion of the monitor image. Since the coils 124 and 126 of the common-mode choke are wound out of phase with each other on a common core 128, noise is cancelled or minimized to an acceptable level. Fast transient noise is amplitude limited with the use of a semi-conductor transient voltage suppressor 130 (TVS). Power supplied to the components of system 2 is therefore essentially clean and isolated from the battery source 24.

While the invention has been described and illustrated powered by a 24 volt bus battery, a 12 volt battery, for example, might be used with a 24 volt D.C. converter and filter 122 being provided. Other power sources of course, with appropriate filters and converters being provided as required, may be used.

The system of the present invention will permit selective transmission or different transmitter channels of individual audio tracks on a video cassette played (e.g. one track/channel in English, one track/channel in French). The system may be readily installed in, for example, coaches or sleepers in trains, boats, motor homes, school buses and other forms of public transit.

As illustrataed schematically in FIGURE 9, with an external antenna 126 and a modem 128, the system can be adapted to receive digitally transmitted audio and/or video signals from a studio 130 or other source, and air or store them in the bus, as illustrated schematically in FIGURE 9. FIGURE 10 illustrates a

schematic flow chart of a cellular video distribution system to provide audio and video signals to a system 2 adapted to receive and decode digitized signals. The system may use fibre optics cabling, particularly where it is desired to have the signal digitized.

Monitors 10, while being shown in FIGURES 1, 3 and 4 as being wired to VCPs 8 through logic control means 34, may alternatively be arranged so that video signals are passed to the monitors by wireless transmitter means.

Satellite reception of video and audio signals with an appropriate antenna is also possible and is considered to be within the scope of the present invention.

The present invention is also envisaged as being readily adaptable for sporting events, air shows, golf tournaments, auto racing and the like, where small, low power transmitters can be placed throughout the sporting event area and the spectators then be given receivers with appropriate ear phones to receive the audio information being transmitted. Transmitters can be fed from a central transmitter by another channel.

The entertainment system according to the present invention has many advantages over prior art systems, including a significant improvement in quality of picture provided, the provision of audio signals on a selective basis (i.e. only to those who have a head set), arrangement of the components in a manner which minimizes the potential for theft and vandalism, and ready installation of the system or its individual components on or removal from the bus or other form of coach in which the system is

installed.

Thus it is apparent that there has been provided in accordance with the invention a passenger entertainment system for coaches that fully satisfies the objects, aims and advantages set forth above. While the invention has been described in conjunction with specific embodiments thereof, it is evident that many alternatives, modifications and variations will be apparent to those skilled in the art in light of the foregoing description. Accordingly, it is intended to embrace all such alternatives, modifications and variations as fall within the spirit and broad scope of the invention.

THE EMBODIMENTS OF THE INVENTION IN WHICH AN EXCLUSIVE PROPERTY OR PRIVILEGE IS CLAIMED ARE DEFINED AS FOLLOWS:

1. In a passenger entertainment system for coaches having seats for passengers comprising one or more video cassette player means, one or more monitor means electrically associated with the video cassette player means, and circuitry to electrically connect the video cassette player means and monitor means to an electrical power means to drive the video cassette player means, the improvement characterized by a radio transmitter means to be powered by the electrical power means electrically associated with the video cassette player means to effect wireless transmission of audio signals from the video cassette player means to a plurality of receiver means positioned in the vicinity of the passengers, the receiver means each being selectively operable in conjunction with a head set releasably securable thereto to provide audio signals directly to the ears of a passenger.

2. A system according to claim 1 wherein a receiver means is located in the vicinity of each passenger.

3. A system according to claim 2 wherein each receiver means is powered by battery means releasably insertable into that receiver.

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4. A system according to claim 3 wherein each receiver is provided with channel selection means and sound level adjustment means.

5. A system according to claim 3 wherein each receiver is releasably secured to a passenger seat.

6. A system according to claim 3 wherein the head sets for each receiver means comprise earphones having a wire lead to be releasably connected to one of said receiver means.

7. A system according to claim 6 wherein the wire leads for the earphones are secured to the battery means at a predetermined location and each of said receiver means is arranged so that when the battery means is inserted therein, the earphone wire lead will make electrical contact with a contact of the receiver means to provide audio signals from the receiver means to the earphones.

8. A system according to claim 1 which further comprises a conventional coach speaker system electrically wired to the video cassette player means and means to select either the conventional coach speaker system or the transmitter means for transmission of audio signals to the passengers.

9. A system according to claim 1 further comprising remote control switch means electrically associated with the video cassette player means to control for the video cassette player means its on/off and cassette playing, and the providing of power to the system.

10. A system according to claim 8 further comprising remote control switch means electrically associated with the video cassette player means to control for the video cassette player means its on/off and cassette playing and, the providing of power to the system, and selection of either the conventional coach speaker system or the wireless transmitter means for transmission of audio signals from the video cassette player to the passengers.

11. A system according to claim 10 wherein the coach is a bus and the system further comprises remote control switch means electrically associated with the video cassette player means to control for the video cassette player means its on/off and cassette playing and switching of the video cassette player, the providing of power to the system and selection of either the conventional coach speaker system or the wireless transmitter means for transmission of audio signals from the video cassette player to the passengers and further, wherein a pair of video cassette players are provided and the remote control switch means is positioned near a seat where the bus driver sits to operate the bus.

12. A system according to claim 1 further comprising logic means electrically associated with video cassette player means, monitor means, and transmitter means, said logic means arranged to properly control their inter-relationship and functioning.

13. A system according to claim 9 further comprising logic means electrically associated with video cassette player means, monitor means, electrical power means and transmitter means and remote control switch means, said logic means arranged to enable the remote switch means to control the functioning, through said logic means, of the video cassette player means, monitor means, and transmitter means.

14. A system according to claim 12 further comprising a noise filter in the form of a common-mode choke having coils wound out of phase with each other on a common core, the common-mode choke being electrically associated with the system to minimize interference and electronic noise which would otherwise be passed to the monitor means.

15. A system according to claim 13 further comprising a noise filter in the form of a common-mode choke having coils wound out of phase with each other on a common core, the common-mode choke being electrically associated with the system to minimize interference and electronic noise which would otherwise be passed to the monitor means.

16. A system according to claim 11 further comprising a noise filter in the form of a common-mode choke having coils wound out of phase with each other on a common core, the common-mode choke being electrically associated with the system to minimize interference and electronic noise which would otherwise be passed to the monitor means.

17. A system according to claim 11 wherein the circuitry comprises cables to be removably secured to the bus, to the ends of which cables are fitted electrical connection means to releasably mate with corresponding electrical connection means of the video cassette player means, monitor means, electrical power means, transmitter means and remote control switch means.

18. A system according to claim 17 wherein rack means are secured within the bus to receive the video cassette player means and the monitor means and lock means are associated therewith to enable the video player means and monitor means to be releasably locked in position in said rack means.

19. A system according to claim 1 further provided with portable wireless transmitter means and wherein the receiver means are releasably securable on the coach and otherwise portable.

20. A system according to claim 1 further provided with antenna means for picking up audio and/or video signals from a source outside the bus, said antenna electronically communicating with a means for translating said signals to audio or audio/visual electronic signals and for transmission thereof to said receiver means positioned in the vicinity of the passengers.

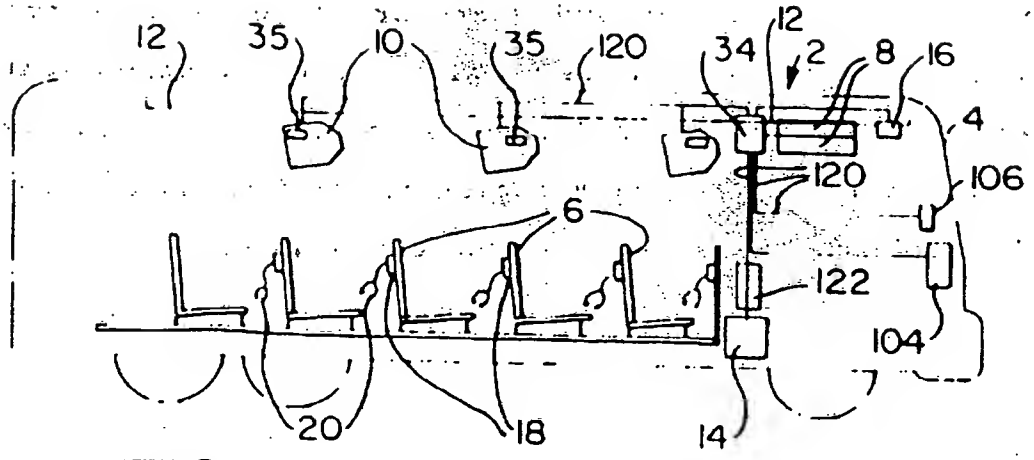

FIG. 1

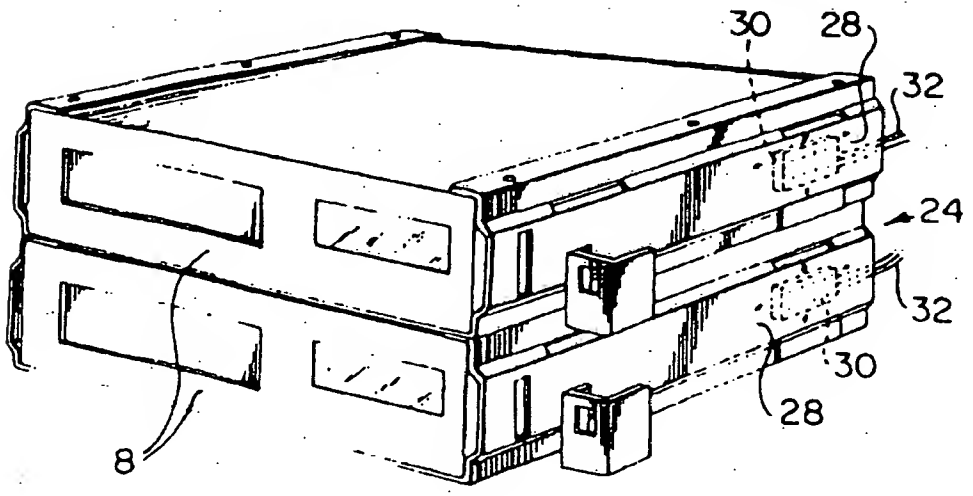

FIG. 2

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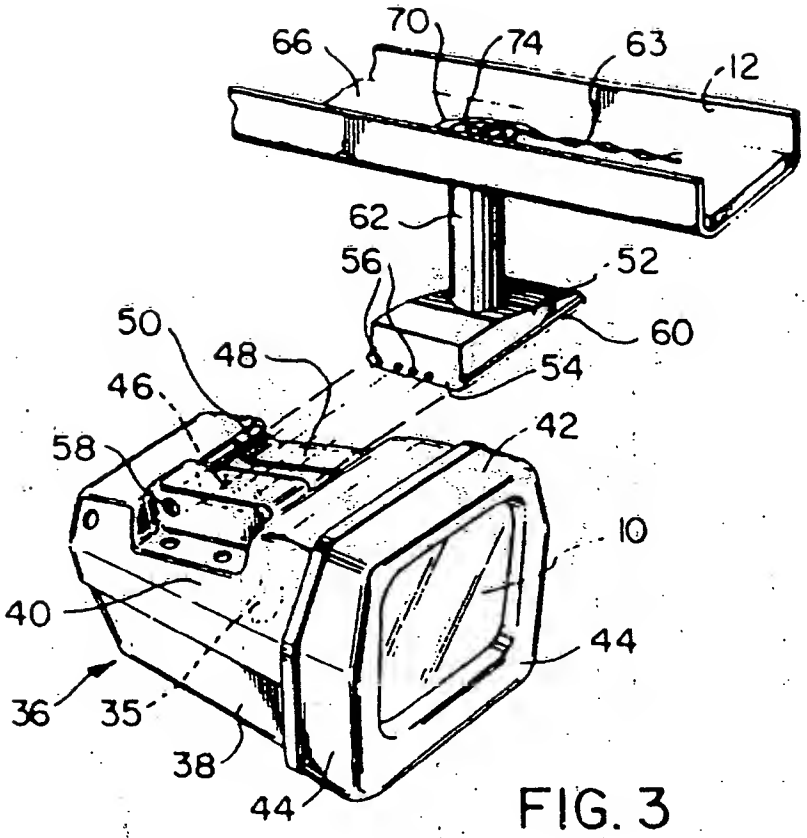

FIG. 3

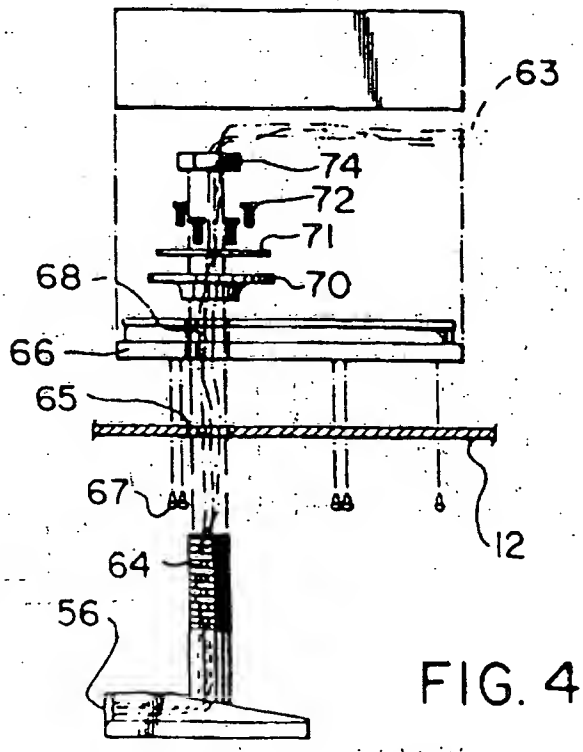

FIG. 4

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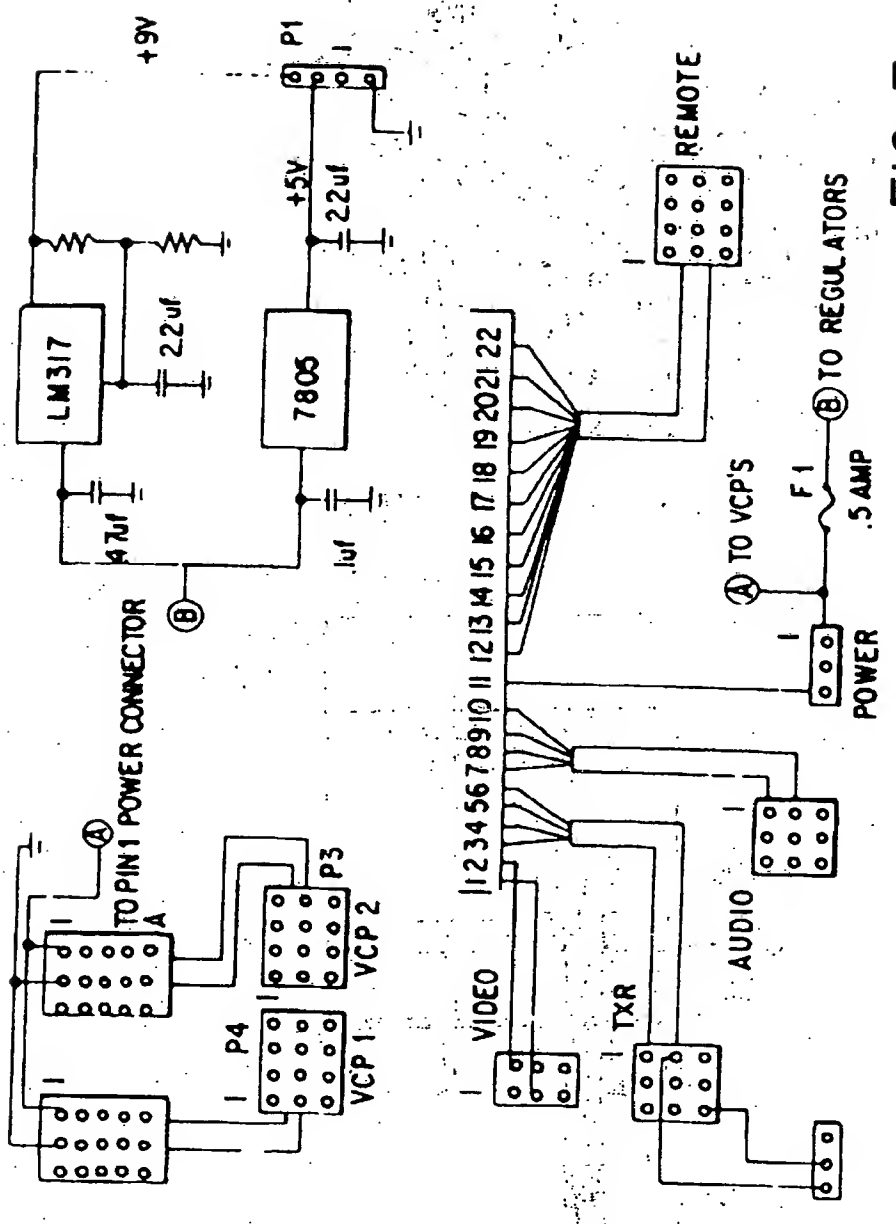

FIG. 7

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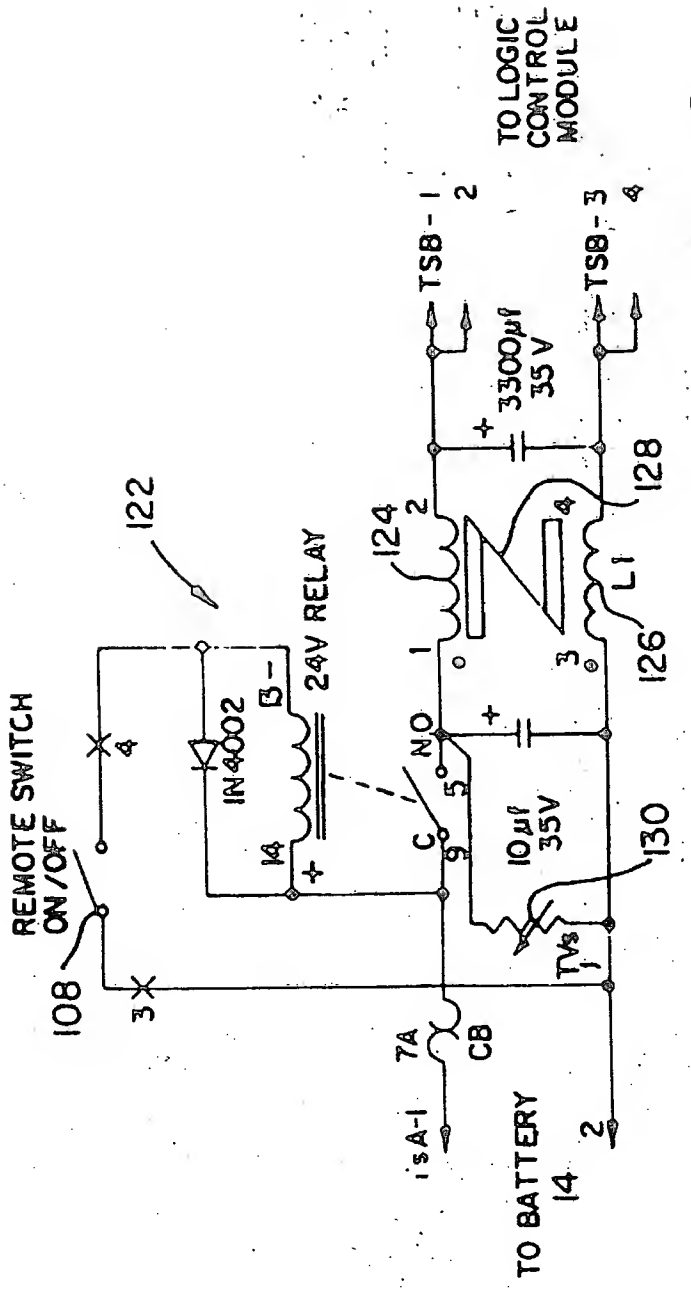

FIG. 8

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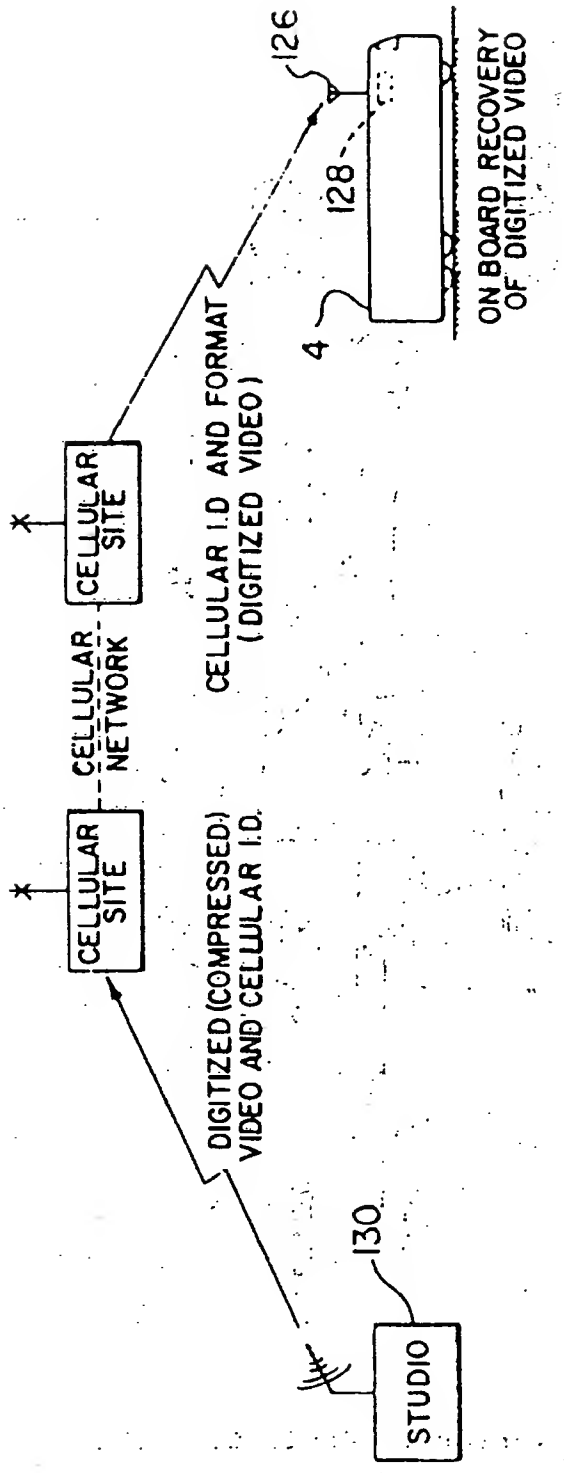

FIG. 9

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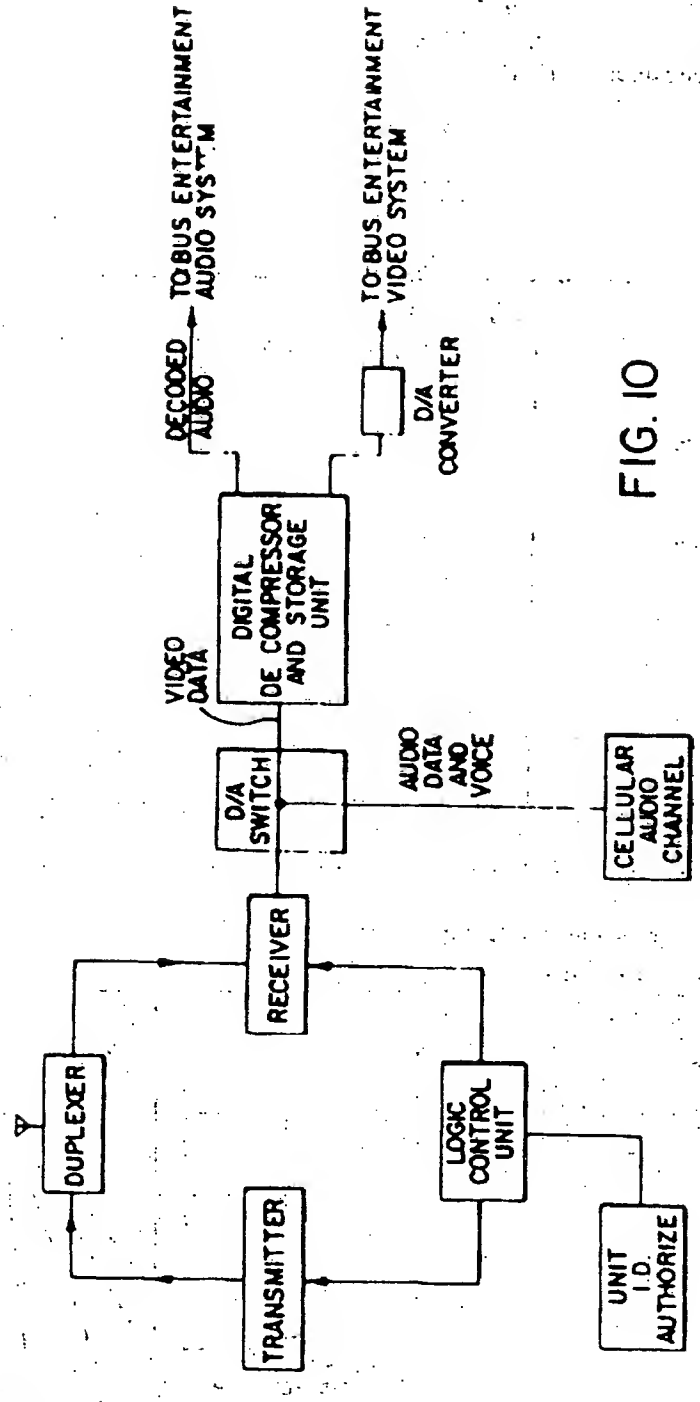

FIG. 10

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